stronger base than manganese or iron oxide, so the latter at correspondingly high temperatures will be displaced by the lime from combination with the acid, and will be converted into the free state in which the action of the reducing agent is more readily active. Similarly silicic acid, as the more powerful acid, displaces phosphoric acid, and makes the latter qualified for reduction. One can thus by lime additions much favour the conditions for the reduction of iron and manganese from their compounds, whereby at the same time the silicic acid and the phosphoric acid will be brought into a form in which they are no more reducible in our usual furnaces, inasmuch as the lime is not attackable in these. Whilst, however, the silicic acid is now for ever shielded from reduction, the phosphorus can be again reduced if, one sets free the phosphoric acid from the phosphate of lime by the addition of free silicic acid.

Although one is thus able by means of lime additions to considerably facilitate the reduction of iron and manganese from their chemical compounds, yet one is not able to com-pletely set on one side the difficulties thereof. This depends on the compounds of iron and manganese oxides being easily fusible, the lime salts corresponding thereto on the contrary being very infusible. With the removal of the oxygen contents, the melting point of the melted substance is increased, and the moment at which they are transformed from the fluid into the solid condition the reaction must cease, as now the contact between the solid or melted reducing agent and the individual molecules of the substances to be reduced will not be longer possible. In consequence one cannot by the medium of lime attain complete reduction of the entire iron and manganese from their compounds. Nevertheless the amounts which they remove by reduction are smaller the higher the temperature reached in employment.

It is thus shown that the employment of lime for reduction should be cut off to those amounts of silicic and phosphoric acids which are combined with lime, as ivell as so much oxide of manganese and iron as arc necessary for the mdted substance technically called slag, to maintain the fluid condition at reaction temperature.